

GAS FLOW PRE-CHARGE FOR A PLASMA ARC TORCH

ABSTRACT OF THE DISCLOSURE

A system for controlling gas flow from a gas source, through a gas conduit, and to a plasma arc torch during a transition from a cold flow when no arc is present to a hot flow when an arc is provided by the present invention. The system comprises a first solenoid in communication with the gas source, a second solenoid disposed proximate the plasma arc torch, and a bypass circuit in communication with the gas source and the second solenoid. The bypass circuit comprises a bypass solenoid that controls the gas pressure within the gas conduit to reduce gas flow fluctuations when transitioning from cold flow to hot flow. Additional gas control systems and methods are also provided that cause the gas pressure to be higher during cold flow, prior to arc ignition, which overcomes the rapid drop in flow that typically occurs during the transition to hot flow.